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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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03/15/2001

Chris Heegard

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EXAMINER

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ART UNIT

PAPER NUMBER

2634

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Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No. 09/809,748	Applicant(s) HEEGARD ET AL.	
	Examiner Ted M Wang	Art Unit 2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 March 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-11,13 and 16 is/are rejected.
- 7) ☒ Claim(s) 2, 12, 14, and 15 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>4</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-16 are pending in the application.

Specification

2. The disclosure is objected to because of the following informalities:
 - Inconsistency notations for the frequency offset and phase offset. Refer to page 8-10, 12, 13, and 18.
 - Page 18 line 4, "carrier frequency offset estimate.." should be changed to "carrier phase offset estimate..".
 - Page 18 line 5, "carrier phase offset estimate.." should be changed to "carrier frequency offset estimate..".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 7-12 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

- Claims 7-12, items (b) determining an angular location of first symbol, and (c) determining an angular location of first symbol have not been taught by the applicant as described in the specification. The specification only discloses a calculate phase module (210) to receive the symbols and calculate the phase. For further examination examiner currently interprets items (b) and (c) as a phase calculation module.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

6. Claims 1 and 7 are rejected under 35 U.S.C. 102(a) as being anticipated by Rafie et al. (US 2002/0126748 A1).

Claim 7 has been rejected as described in the above paragraph. However, for further examination examiner currently interprets items (b) and (c) as a phase calculation module.

- In regard claim 1, Rafie et al. discloses a carrier phase recovery system with (a) estimating one or more phases of a sequence of digitally modulated symbols (Fig.2 and Fig.4, and column 4 paragraph 43 –49, and paragraph 52-57);

- (b) removing from each of the estimated phases an angle rotation introduced by a modulation format, wherein the rotation is determined based on a reference symbol (column 4 paragraph 50);
 - (c) deriving a set of values from the estimated phases after removal of said angle rotation, wherein said values are a function of the carrier frequency and phase offsets to be estimated (Fig.4 and column 4 paragraph 43 –49, and column 5 paragraph 53-61); and
 - (d) processing said values to determine estimates of the carrier frequency and phase offsets (page 1 paragraph 7 and page 3 paragraph 36).
- In regard claim 7, all limitation is contained in claim 1. The explanation of all the limitation is already addressed in the above paragraph.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 8-10 have been rejected as described in the above paragraph. However, for further examination examiner currently interprets items (b) and (c) as a phase calculation module.

8. Claims 3 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rafie et al. (US 2002/0126748 A1) in view of Montreuil (US5,960,044).

- In regard claim 3, Rafie et al. discloses all of the limitation as described in the above paragraph except specifically teaching that step (c) described in the above paragraph uses an unwrap phase function to derive set of values.

Montreuil discloses a method for block phase estimation that uses an unwrap phase function to derive set of values (Fig.6 element 30, and column 4 line 66 – column 6 line 54) in order to provide a phase averager to avoid an inaccurate result because of the discontinuity caused by an operation of averaging two phase angles.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Rafie's carrier phase recovery system in view of Montreuil's disclosure in order to provide a phase averager to avoid an inaccurate result because of the discontinuity caused by an operation of averaging two phase angles.

- In regard claim 8, all limitation is contained in claim 3. The explanation of all the limitation is already addressed in the above paragraph.

9. Claims 4 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rafie et al. (US 2002/0126748 A1) in view of Dobrica (US5,875,215).

- In regard claim 4, Rafie et al. discloses all of the limitation as described in the above paragraph except specifically teaching that the processing of step (d) uses an estimation algorithm based on the recursive least-squares method.

Dobrica discloses a carrier synchronizing unit that uses an estimation algorithm based on the recursive least-squares method (Fig.2 element 7 and Fig.3 and 4, column 1 line 40 – column 2 line 3, column 5 line 51 – column 6 line 10, and column 7 line 63 – column 10 line 1) in order to provide a novel carrier synchronizing unit for a coherent detection data communication system over non-frequency selective fading channels wherein the redundancy in estimation of a fading channel multiplicative distortion is reduced to improve the reliability of the estimation and to compensate for an influence of a tracking delay in RLS estimation.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Rafie's carrier phase recovery system in view of Dobrica's disclosure in order to provide a novel carrier synchronizing unit for a coherent detection data communication system over non-frequency selective fading channels wherein the redundancy in estimation of a fading channel multiplicative distortion is reduced to improve the reliability of the estimation and to compensate for an influence of a tracking delay in RLS estimation.

- In regard claim 9, all limitation is contained in claim 4. The explanation of all the limitation is already addressed in the above paragraph.

10. Claims 5, 10, 13, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rafie et al. (US 2002/0126748 A1) in view of Li et al. (US6,031,880).

- In regard claim 5, Rafie et al. discloses all of the limitation as described in the above paragraph except specifically teaching that the processing of step (d) uses an estimation algorithm based on the Kalman filtering method.

Li et al. discloses a carrier recovery in a communication system that the processing of step (d) uses an estimation algorithm based on the Kalman filtering method (Fig.4 element 70, column 1 line 39 – column 2 line 8, and column 5 line 42 – column 7 line 41, and column 9 line 20 – column 10 line 34) in order to provide an improved method of and apparatus for use in carrier recovery using a known sync word in a received communications signal.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Rafie's carrier phase recovery system in view of Li's disclosure in order to provide an improved method of and apparatus for use in carrier recovery using a known sync word in a received communications signal.

- In regard claim 10, all limitation is contained in claim 5. The explanation of all the limitation is already addressed in the above paragraph.
- In regard claim 13, which is a system claim related to claim 5, all limitation is contained in claim 5. The explanation of all the limitation is already addressed in the above paragraph.
- In regard claim 16, all limitation is contained in claim 1, where Kalman filtering algorithm is a curve-fitting algorithm. The explanation of all the limitation is already addressed in the above paragraph.

11. Claims 6 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rafie et al. (US 2002/0126748 A1) in view of Denno et al. (US5,287,067).

- In regard claim 6, Rafie et al. discloses all of the limitation as described in the above paragraph except specifically teaching that the processing of step (d) uses an estimation algorithm based on the least-mean squares method.

Denno et al. discloses a method and apparatus for demodulation with adaptive phase control in quasi-coherent detection that uses an estimation algorithm based on the least-mean squares method (Fig.13 and column 10 line 65 – column 11 line 50) in order to estimate and correct the time variation of the detection phase error due to the initial phase error and the frequency error, at high speed, such that the proper demodulated signals can be obtained at high quality, without a complicated circuit configuration and a significant delay.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Rafie's carrier phase recovery system in view of Denno's disclosure in order to estimate and correct the time variation of the detection phase error due to the initial phase error and the frequency error, at high speed, such that the proper demodulated signals can be obtained at high quality, without a complicated circuit configuration and a significant delay.

- In regard claim 11, all limitation is contained in claim 6. The explanation of all the limitation is already addressed in the above paragraph.

Allowable Subject Matter

12. Claims 2, 12, 14, and 15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

13. Reference US5,799,047 and 6,160,854 are cited because they are put pertinent to the carrier synchronization. However, none of references teach detailed connection as recited in claim.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ted M Wang whose telephone number is (703) 305-0373. The examiner can normally be reached on 8:30 a.m. - 5:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Chin can be reached on (703) 305-4714. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 306-0377.

Ted M. Wang

Ted M Wang
Examiner
Art Unit 2634


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